

## Geology of the Cape Porcupine Complex, Guysborough County, Nova Scotia

Chris E. White<sup>1</sup>, Sandra M. Barr<sup>2</sup>, John W.F. Ketchum<sup>3</sup>, and Martin Ethier<sup>2</sup>

<sup>1</sup>*Nova Scotia Department of Natural Resources, P.O. 698, Halifax, NS B3J 2T9*

<sup>2</sup>*Department of Geology, Acadia University, Wolfville, NS B0P 1X0*

<sup>3</sup>*Royal Ontario Museum, 100 Queens Park, Toronto, ON M5S 2C6*

Varied igneous and metamorphic rocks termed the Cape Porcupine Complex form a prominent hill adjacent to the Canso Causeway. These rocks are situated in a strategic position in the configuration of tectonostratigraphic terranes in the northern Appalachian orogen. Hence this study was undertaken to describe the rock types that form Cape Porcupine, determine their age, and compare them to other "basement" rocks in northern mainland Nova Scotia and adjacent parts of Cape Breton Island.

A fault-bounded metasiltstone unit occupies the central area of the complex. The metasiltstone is typically well foliated with a strong north-trending subhorizontal lineation. A fault-bounded unit of metavolcanic rocks forms part of the eastern part of the complex, and consists dominantly of grey crystal to crystal-lithic rhyolitic tuff with phenocrysts of quartz, anorthoclase, and/or plagioclase. Like the metasedimentary unit, it is strongly foliated with a shallow, north-plunging lineation defined by stretched quartz crystals and lithic clasts. Granitoid rocks occur in both the western and eastern parts of the complex. In the west they include bodies of leucodiorite to tonalite, monzogranite to alkali-feldspar granite, and alkali-quartz syenite. In the east the granitoid rocks are dominantly alkali-feldspar granite with minor monzogranite. In addition, the easternmost granitic rocks

locally display mylonitic fabric parallel to that in the metasedimentary and metavolcanic rock units. The Cape Porcupine Complex is intruded by several generations of variably altered mafic dykes. The complex is in faulted contact on its northern and western margins and unconformably overlain on its southern margin by Carboniferous sedimentary rocks of the Clam Harbour River Formation of the Horton Group.

The granitoid units in the Cape Porcupine Complex are Late Neoproterozoic, based on a U-Pb (zircon) age of  $610 \pm 3$  Ma from a syenogranite sample, and hence are similar in age to some granitoid units in southeastern Cape Breton Island and to the Georgeville Pluton in the Antigonish Highlands. However, analysed samples from Cape Porcupine are chemically distinct from the Georgeville Pluton and appear more similar to the felsic components of ca. 620 Ma calc-alkaline plutons of the Mira terrane. The ages of the associated metasedimentary and metavolcanic rock units are uncertain. The mylonitic units in the Cape Porcupine Complex provide direct evidence for the existence of the Canso Fault and indicate that it is a major pre-Carboniferous, north-south trending feature, and not parallel to the present-day Strait of Canso.